



National Transportation Systems Center



Richard R. John

Director's Notes

Ensuring the Safety and Security of Ports

Over the past months, tragic events have heightened concerns about the vulnerabilities of ports and borders. The Volpe Center has joined several federal, state, and private organizations in seeking methods of enhancing homeland security in port areas while facilitating international commerce.

The Center is collaborating with the U.S. Coast Guard and the Technical Support Working Group of the Combating Terrorism Technology Support Office of the Department of Defense (CTTSO/TSWG) in Operation Safe Commerce. This innovative public and private partnership responds to the twin imperatives for border security and facilitated flows of legitimate international commerce. Key federal, state, and private entities in the United States and Canada are working together through this partnership to construct a prototype of a secure international trade corridor. The partnership is officially organized as the Law Enforcement Coordinating Council Operation Safe Commerce Committee.

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HIGHLIGHTS

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Focus

Supporting RSPA and its new Administrator

The Research and Special Programs Administration (RSPA), an agency within the U.S. DOT and the parent organization for the Volpe Center, provides vital services to the nation's dynamic transportation system.

The RSPA Administrator, Miss Ellen G. Engleman, was sworn in on September 25, 2001. She is a business leader, attorney, and accredited public relations professional, as well as a commissioned officer in the U.S. Naval Reserve serving in a Naval Reserve unit supporting the Chief of Naval Information in the Pentagon.

She was most recently president and chief executive officer of Electricore, Inc., an Indiana-based nonprofit consortium for research and development (R&D) of advanced transportation and energy technologies through federal private/public partnerships. Over six years, she led the consortium's expansion to participation by major U.S. automotive manufacturers, large and small businesses in 17 states and over 25 universities, and to federal R&D partnerships of \$160 million involving more than 70 projects.

Miss Engleman leads RSPA in its mission to protect people and the environment from risks of hazardous materials transportation; promote transportation innovations through research, technology, education, and training; and manage transportation emergency services. RSPA pursues four strategic goals in carrying out this mission: safety environmental protection, emergency management, and research and technology innovation.



Administrator Ellen G. Engleman leads RSPA as it continues to make America's transportation system more integrated, effective, and secure. RSPA provides innovative, collaborative solutions in transportation safety, research, education, and emergency management.

RSPA offices work collaboratively to achieve these integrated goals.

- **Safety:** Protect the public from deaths, injuries, and property damage caused by transportation of hazardous materials;
- **Environmental Protection:** Protect our natural environment from damage caused by transportation of hazardous liquids by pipelines;
- **Emergency Management:** Ensure our nation's transportation system functions adequately during natural disasters and national security crises so that adverse impacts on people and property are minimized; and
- **Research and Technology Innovation:** Promote innovation through science and technology to support the achievement of national transportation goals of safety, homeland security, mobility and economic growth, and human and natural environment.

An office of RSPA, the Volpe Center executes projects in support of the RSPA Offices of Hazardous Materials Safety; Pipeline Safety; Emergency Transportation; and Innovation, Research and Education.

Safety and Environmental Protection

The Volpe Center has been supporting RSPA's Office of Hazardous Materials Safety (OHM) and its predecessor organizations for more than 20 years. This support has included performing a variety of background studies examining the movement and safety of hazardous materials (hazmat), and analyses in support of proposed changes in hazmat regulations. Currently, the Center is conducting a comprehensibility study of labels for hazmat that considers the introduction of the United Nations Global Harmonization System (GHS) for labeling hazardous chemicals.

Volpe staff support two information systems for OHM: the Hazardous Materials Registration Information System (HAZREG) and the Hazardous Materials Information System (HMIS). HAZREG, which is evolving into an e-government application, supports registration of transporters of certain classes and quantities of hazardous materials. HMIS enables OHM managers to monitor the performance of RSPA's hazardous materials transportation safety programs.

The Volpe Center works with several other RSPA offices to pursue RSPA's strategic goals.



The Center's work for RSPA's Office of Pipeline Safety (OPS) has included analytical and technical support, including cost-benefit analyses related to regulatory changes and background studies on safety issues. Currently, Volpe is working with OPS on a knowledge-based, decision-support system that will allow OPS to leverage its resources to ensure safer pipeline distribution systems. Volpe support includes creating an automated system to support communications between OPS, its regional field offices, and the state pipeline offices. The Center is also developing data analysis and information management strategies to enhance OPS's trend analysis and proactive information management.

Emergency Management

RSPA's Office of Emergency Transportation (OET) tasked the Volpe Center with supporting development of DOT's Transportation Information Operations Center. This facility will be the center for communication within DOT and with other agencies and industry during a crisis such as a natural disaster, a major transportation-related accident, or a security threat. The Volpe team is working with OET to help integrate the definition, planning, design, and implementation of the facility. The Center is also supporting the OET in developing a coordinated, comprehensive emergency transportation database for DOT, in cooperation with the Federal Emergency Management Agency (FEMA). This database contains detailed points of contact and transportation requirements for the numerous components of the federally defined emergency support functions. Staff from the Volpe Center also worked with OET immediately following September 11, 2001, to coordinate DOT's support to FEMA.



Research and Technology Innovation

RSPA's Innovation, Research and Education program is the focal point for a departmental effort to shape and advance the national transportation R&D agenda. The DOT's R&D programs leverage the research investments of other federal agencies, state and local governments, the private sector, and academia to stimulate transportation innovation. The Volpe Center produced a seminal Transportation Science and Technology Strategy for the federal government. The Center also completed the final draft of the *FY 2002 DOT Research, Development, and Technology Plan* (Report to Congress) in January 2002. Currently, Volpe staff members are developing the second edition of the *International Transportation R&D Assessment*.

A Volpe team is developing a series of workshops on infrastructure assurance and homeland security.

The Center performed a vulnerability and risk analysis of surface transportation, addressing threats such as traditional attacks using weapons of mass destruction, as well as threats involving emerging biological and chemical weapons. In support of RSPA's Transportation Infrastructure Assurance research, a Volpe team is assessing the interdependencies of critical operating elements of the transportation system, including telecommunications and electric power, and analyzing the potential impacts on people and systems of their loss or damage.

To facilitate public-private research partnerships, the Volpe Center provides white papers and conducts seminars and technical meetings. In January 2002, Volpe staff completed the report "Public-Private Partnerships III: Engines for Innovation." A Volpe team is also developing a series of workshops involving infrastructure assurance and homeland security.

Under a TEA-21 (Transportation Equity Act for the 21st Century) mandate, DOT, in cooperation with NASA, is validating commercial remote sensing products and spatial information technologies for multimodal transportation applications. For the past 4 years, the Volpe Center provided technical assistance in this area to RSPA, which also relied on the Office of the Secretary and a Remote Sensing Working Group supplemented by experts from NASA and the Transportation Research Board. The Center organized a national symposium; supported program reviews and project management; and designed, implemented, and maintains RSPA's Remote Sensing Web site.

RSPA's University Transportation Centers (UTC) Program advances U.S. technology and expertise in transportation through education, research, and technology transfer at university-based centers of excellence; the Volpe Center is responsible for the UTC Web site. The Center also maintains the RSPA Web site, the RSPA Chief Counsel site, the RSPA OET site, the Technology Sharing Program site, the DOT Technology and Innovation site, and the DOT Transportation Science and Technology site.

As a key component of RSPA, the Volpe Center will continue to support its mission through the advancement of safety, environmental protection, emergency management, and research and technology innovation.

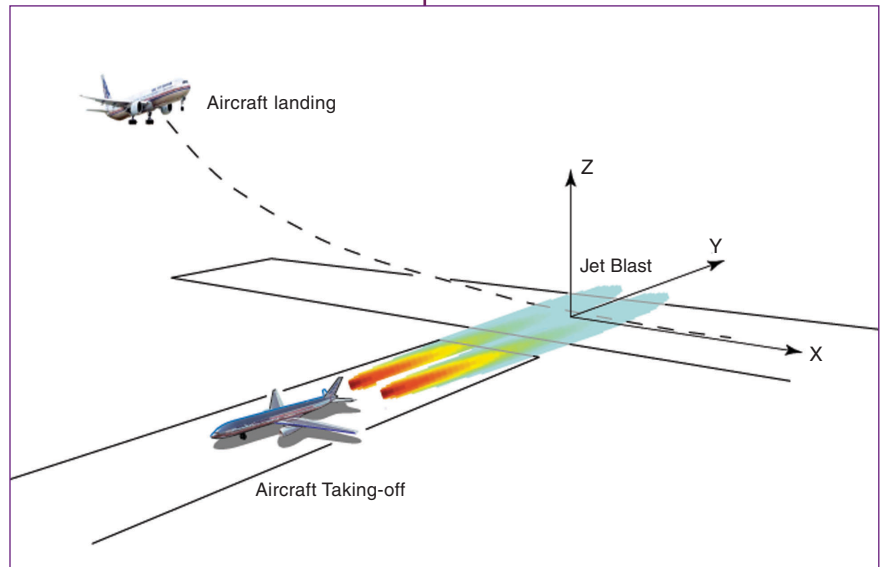




Volpe Staff Member is Guest Editor for Air Traffic Control Quarterly

Air Traffic Control Quarterly recently published its special issue on Flight Safety [Vol. 9, Number 3, 2001]. Published by the Air Traffic Control Association, a nonprofit professional organization, this quarterly journal presents peer-reviewed and selected technical articles authored by noted air traffic control experts from leading research and academic organizations from around the world. Dr. James Hallock, Aviation Safety Division, served as the Guest Editor of the Flight Safety issue, which examines the breadth of aviation safety analysis, presenting the application of various analysis techniques to diverse problems in the aviation realm. Three papers from the Volpe Center were included:

- "GPS Availability and Outage Reporting for Aviation Applications," by Ms. Karen Van Dyke of the Center for Navigation. This paper examines GPS availability requirements by phase of flight and level of implementation. The impact of GPS satellite outages is discussed as it affects the availability of GPS for navigation.
- "Simulation of Jet Blast Effect on Landing Aircraft," by Dr. Yan Zhang, Mr. Robert Rudis, and Dr. Frank Wang, all of the Surveillance and Sensors Division; and Mr. Ed Spitzer, Director of the Office of Traffic and Operations Management. This paper uses a computer simulation to examine the jet blast effect from a departing aircraft on an aircraft landing on a perpendicular runway.
- "Air Traffic Control in Airline Pilot Simulator Training and Evaluation," by Dr. Judith Burki-Cohen and Mr. Andrew Kendra of the Operator Performance and Safety Analysis Division. This paper addresses the need for simulating realistic radio communications during airline pilot training and evaluation.



The impact of jet blast from a departing aircraft on the control authority of another aircraft landing on an orthogonal runway has long been a concern in the aviation community. The Volpe paper, "Simulation of Jet Blast Effect on Landing Aircraft," describes a computer simulation of these circumstances.



Mobility

Planning Alternative Transportation for the Morristown National Historical Park (NPS)

The mission of the National Park Service (NPS) is to preserve unimpaired the natural and cultural resources of the National Park System for the enjoyment, education, and inspiration of this and future generations. However, the Park Service must also provide public access to the resources that it is dedicated to protecting. Growing visitation, traffic congestion, and greater awareness of environmental issues have put pressure on transportation infrastructure in the National Parks and their surrounding areas. The level and impact of park visitation has often far exceeded planners' estimates; visitors driving their individual, private vehicles can adversely impact a park or its surrounding region's natural and/or cultural resources.

To address these issues, many National Parks have introduced Alternative Transportation Systems (ATS) to help reduce traffic congestion, alleviate environmental impacts, and provide a more enjoyable visitor experience. Volpe staff recently conducted an ATS Planning Study for the Morristown National Historical Park in Morristown, New Jersey. The Volpe team includes Dr. Jeff Bryan, Ms. Cassandra Callaway, and Mr. David Spiller of the Office of System and Economic Assessment, and Mr. Bill Giezantanner of Planners Collaborative (a Volpe Center contractor).

In 1933, Congress designated lands and properties in the Morristown area as the first National Historical Park in the National Park System. The Park consists of four units that played important roles during the American Revolutionary War. Located less than 30 miles west of New York City, Morristown has become much more than an area of historical significance. Today, it is a tree-lined bedroom suburb of New York City, a growing employment center, and home to a rich diversity of historical, cultural, and recreational attractions. A growing economic base combined with significant residential and commercial development has left the town and county struggling to cope with the resulting traffic congestion. Several efforts are underway to explore regional transit services and rerouting of traffic through Morristown's central business district to cope with the increasing traffic in the area.



Morristown National Historical Park preserves sites in the Morristown, New Jersey area occupied by General George Washington and the Continental Army during the Revolutionary War from 1779-1780. The Ford Mansion, above, was General Washington's military headquarters during that winter. The Volpe Center is working to help the Park preserve and protect its natural and cultural resources by evaluating public transit alternatives for the Park and its surrounding community. (NPS photo)

The four Park units combined attract approximately 536,000 visitors annually; 98 percent of those visitors arrive by personal vehicle.

Within this context, the NPS asked the Volpe Center to define and evaluate alternatives for providing public transit for visitors to the Park and other sites in Morristown. The ATS Planning Study resulted in a clear outline of potential ATS routes and system management options to meet the Park's objectives. Additionally, Volpe laid out potential benefits of ATS, including assisting in the protection of the Park's natural and cultural resources, improving visitor safety, enhancing the experience of visiting the units and other sites in the Morristown area, as well as reducing overall traffic congestion.

In October, 2001, members of the Volpe team presented the ATS Planning Study's findings and recommendations to the Park and a group of local stakeholders. Participants voiced strong interest in proceeding collaboratively with planning an ATS for Morristown. Over the next few months, stakeholders will convene again to identify and address issues related to planning an ATS, with the intent of conducting a pilot program to test the feasibility of an ATS for Morristown.

Volpe's planning study presented a clear outline of potential alternative transportation routes and system management options to meet the Park's objectives.

Water Transportation Planning (State of Massachusetts)

The Volpe Center provides expertise in marine transportation to the National Highway Traffic Safety Administration, the National Park Service, the U.S. Navy, and the State of Massachusetts by analyzing the commercial viability of ferry service as an alternative to land-based systems in congested areas. For the State of Massachusetts, the Center is working with the Executive Office of Transportation Construction on the analysis of potential ferry and water-shuttle routes in the Massachusetts Bay Area. The results will be used to make strategic decisions for future water-transportation capital projects.

On January 25, 2002, Mr. Michael Dyer of the Technology Applications and Deployment Division hosted the Water Transportation Advisory Council Focus Group at the Volpe Center. The Group includes ferry and terminal owners and operators, port managers, stakeholders, and state transportation planners and regulators. The meeting addressed the technical aspects of the Center's work, including the development of a Service Assessment Tool with economic, technical, and policy elements; an approach to the selection of ferry services; and data collection.



A ferry in Boston Harbor



Supporting Asbestos Air-Monitoring Program (California DTSC)

The Volpe Center is recognized as a technical leader in the investigation and remediation of asbestos contamination. Since January 1999, the Environmental Engineering Division has supported the U.S. Environmental Protection Agency in investigating potential ongoing asbestos exposure of residents in Libby, Montana; more recently, investigations have encompassed associated sites in seven other states. As a result of Volpe's expertise in this area, the California Department of Toxic Substances Control (DTSC) requested Volpe's assistance in support of its asbestos air-monitoring program.

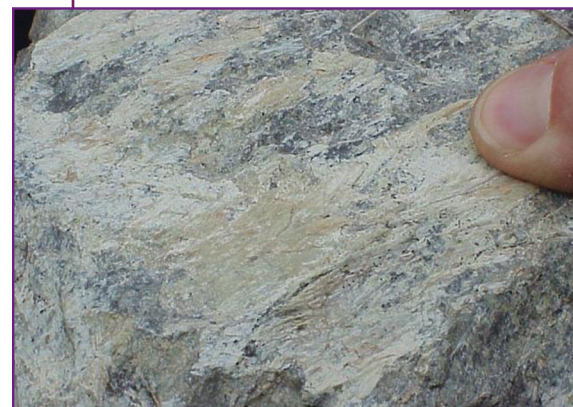
The community of Garden Valley in California has many unpaved roadways known to contain naturally occurring asbestos within the road bed. The community is concerned about potential exposure to toxic asbestos fibers from vehicular traffic on these roads, which are covered with serpentine rock containing the asbestos mineral chrysotile. During the next 8 to 9 months, the Volpe Center, in collaboration with Roger Wayson, associate professor at the University of Central Florida, will conduct a focused air-monitoring study along sections of two unpaved roadways.

The first section is part of a localized roadway in the immediate vicinity of a high school and community park; sampling along this section will assist DTSC in determining if there is a potential for an ongoing asbestos exposure of concern related to attending and/or participating in activities at the school and park.

The second study section is part of one of the community's more heavily traveled roadways, which is more representative of the region's many unpaved, asbestos-containing roadways. The purpose of sampling along this roadway is to determine the airborne asbestos concentration as it relates to variation with time, distance, and traffic volume. This data will be used to create an Asbestos Exposure Screening Tool that will assist DTSC in making remediation and investigation decisions related to similar asbestos-containing roadways located throughout California.



High school with serpentine-covered road in foreground



Typical serpentine rock containing the asbestos mineral chrysotile

Volpe team members include Mr. Mark Raney and Ms. Amishi Joshi from the Environmental Engineering Division and Messrs. Gregg Fleming, Brian Kim, and John McDonald from the Environmental Measurement and Modeling Division.

Assessing Aviation-Related Emissions (FAA)

Aviation-related emissions pose a significant threat not only to the air quality in and around airports, but around the world. In support of the Federal Aviation Administration's (FAA) Office of Environment and Energy, Volpe's Environmental Measurement and Modeling Division improves, enhances, and validates air-quality modeling tools, and evaluates and assesses instrumentation and procedures for the measurement of airport air quality and aircraft-exhaust emissions. In support of the development of the System for Aviation Global Emissions (SAGE), a new computer model for assessing the global emissions from aircraft, the Center acts as system integrator; provides coordination with other technical organizations; develops a comprehensive system design, related algorithms, and coding; prepares documentation; conducts training; and performs analyses.

The Division is conducting a series of studies for validation of the FAA's Emissions and Dispersion Modeling System (EDMS), which assesses local air quality. As part of this effort, from January 7 through January 11, 2002, Mr. Gregg Fleming, Division Chief, and supporting Division staff collected data at a major international airport in the United States. The team performed carbon monoxide measurements at 25 airport locations, measuring emissions from aircraft, aviation ground support and general vehicular traffic, and parking lot activities. In addition, the Volpe team obtained data on meteorological conditions and data from a Differential Geographic Positioning System survey. Similar EDMS validation efforts are planned for other U.S. airports over the next 5 years.



The Environmental Measurement and Modeling Division recently performed carbon monoxide measurements at 25 locations at a major international airport in the U.S. This data collection effort is one of several planned to support validation of the FAA's Emissions and Dispersion Modeling System.

Measurement, Analysis, and Abatement of Railroad Noise (FRA)

Railroad noise is a major transportation issue in the United States. The Volpe Center provides extensive support to the Federal Railroad Administration's (FRA) Office of Research and Development in this area. A current project involves updating the *Handbook for the Measurement, Analysis, and Abatement of Railroad Noise*. This handbook provides an introduction to acoustics and describes the measurement and analysis procedures and

abatement techniques required to meet railroad noise regulations. The update will incorporate improvements and changes in noise measurement instrumentation technology and field measurement techniques as well as U.S. noise policy that have occurred since the release of the document in 1982.

As part of this effort, on February 11 and 12, 2002, Mr. Eric Boeker of the Environmental Measurement and Modeling Division traveled in a locomotive cab from Boston, Massachusetts, to Selkirk, New York, to gather information on sources of noise. Subsequently, on February 21, he visited Washington, D.C., to report the results of his observations to Mr. Rob Castiglione, FRA Office of Safety Analysis. The Volpe Center's Acoustics Facility will be conducting more detailed measurements and analysis of railroad noise in the future using specialized recording and analysis equipment.

As part of the Volpe Center's continuing support to the FRA's Office of R&D, the Acoustics Facility is conducting measurement and analysis of railroad noise.



Volpe Co-hosts Workshop on Bio-terrorism in Transportation

In order to anticipate and respond to the needs of the transportation community, the Volpe Center works to keep its staff educated about cutting-edge issues. In keeping with this approach, the Center initiated and co-hosted a workshop on Bio-terrorism in Transportation with experts from the Harvard School of Public Health on February 14, 2002. Volpe staff from the Office of Environmental Preservation and Systems Modernization assisted in arranging the agenda, speakers and schedule. The workshop featured presentations from Harvard University faculty members and other distinguished guests, and covered a wide range of public health and policy topics related to potential bio-terrorism affecting transportation vehicles, facilities, and passengers. Notable participants included Ms. Janet Benini, Deputy Director, Research and Special Programs Administration's Office of Emergency Transportation; Dr. Jennifer Leaning, Harvard School of Public Health, who presented "Anthrax and the U.S. Postal Service – Implications for the Public Response to Bio-terrorism"; and Dr. Arnold Howitt, Kennedy School of Government, who presented "Institutional Political Perspectives."

The workshop covered a wide range of public health and policy topics related to potential bio-terrorism affecting transportation.

Vessel Identification and Positioning System (CTTSO/TSWG)

The Combating Terrorism Technology Support Office/ Technical Support Working Group (CTTSO/TSWG) is the U.S. national forum that identifies, prioritizes, and coordinates interagency and international research and development requirements for combating terrorism. The CTTSO/TSWG rapidly develops technologies and equipment to meet the high-priority needs of those combating terrorism, and addresses joint international operational requirements through cooperative research and development with major allies. Volpe's Center for Navigation is designing and constructing a prototype Vessel Identification and Position System (VIPS) for the CTTSO/TSWG.

The VIPS program, initiated in response to the October 2000 attack on the USS Cole, has the primary objective of increasing port security by enhancing real-time, situation awareness capabilities. VIPS employs Differential Global Positioning System (DGPS) technology in specially designed transponders, which are installed on U.S. military vessels. Force protection units can track VIPS-equipped vessels on a geographical display. The attack on the USS Cole used a local service vessel in the port of Aden, Yemen; although U.S. Navy vessels in host-nation ports still do business with local companies, before any local service vessel can approach a U.S. vessel, it is boarded and inspected by an explosive-detection team. In the near future, a transponder will then be installed on that vessel so it can also be monitored.

In May 2001, staff from the Center for Navigation traveled to Bahrain to meet with U.S. Navy personnel who would be users of the system in the area of operations, to discuss requirements for the system.

In November 2001, the Volpe team demonstrated the VIPS prototype at Naval Station Norfolk. As a result, Volpe will install the system at Norfolk during the summer of 2002.

On January 16, 2002, the Volpe team visited the Naval Coastal Warfare (NCW) Group Two Headquarters at the Naval Weapons Station Yorktown, Cheatham Annex, in Williamsburg, Virginia. During this knowledge-sharing visit, the Volpe team established a schedule for deploying VIPS with an overseas NCW unit, and familiarized NCW personnel with technical aspects of the system. The Volpe team learned more about NCW operations and intelligence-gathering electronics so that VIPS can be integrated with NCW systems.



The Volpe-developed VIPS prototype employs DGPS in specially designed transponders (right), which are installed aboard U.S. military vessels. Patrol leaders track all assets on a geographic display (left).

Typical of Volpe system development, potential VIPS users were involved early in the process to help ensure that the system will meet their needs.

Papers & Presentations

- "The Use of Photo Enforcement at Highway-Railroad Grade Crossings in the United States," a paper written by Ms. Anya Carroll of the Railroad Systems Division and Ms. Judith Warren of the Information Integration Division, was recently selected for publication in the *Transportation Research Record*. This paper addresses the effectiveness of photo enforcement in use at public highway-rail grade crossings; nationwide institutional issues; judicial concerns; and public perceptions.



Photo enforcement has been in use internationally for over 20 years.

- The Volpe Center is supporting the National Highway Traffic Safety Administration (NHTSA) in implementing the requirements of the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act. The TREAD Act requires vehicle and equipment manufacturers to report periodically to NHTSA on a wide variety of information that could indicate the existence of potential safety defects. NHTSA's Office of Defects Investigation (ODI) requested the Volpe Center's assistance in identifying components and systems to be included in early warning reporting categories, based on historic safety-related recall data. On Monday, December 17, 2001, Ms. Sari Radin of the Economic and Industry Analysis Division delivered a final report to ODI titled "Early Warning Reporting Categories Analysis of Recall and Complaints Data." The report was entered into the docket on December 20, 2001 in support of a Notice of Proposed Rulemaking.
- On February 18 and 19, 2002, Mr. Michael Dyer of the Technology Applications and Deployment Division participated in the Annual Meeting of the Passenger Vessel Association in Biloxi, Mississippi, which focused on the growing demand in the ferry market and on ferries as a vital transportation solution. Mr. Dyer delivered the keynote address, titled "Industry Traffic Patterns and Growth Trends." The address focused on the growth of ferries as a public transport option and the need for cooperation among private and public entities to ensure the "smart" allocation of resources and well-placed ferry services to contribute to the total U.S. transportation system.

Director's Notes

Continued from page 1

The goal is to maintain open borders and facilitate commerce while improving security practices by using point-of-origin security, in-transit transparency and accountability, and data query capability designed to validate and facilitate the movement of legitimate containerized cargo. Operation Safe Commerce has three major thrusts: 1) push the borders back to the manufacturer and validate security at the point of origin; 2) pilot the use of off-the-shelf technologies to monitor the movement of legitimate cargo; and 3) focus on securing the supply chain supporting the movement of international commercial cargo containers. The Volpe Center, in support of the partnership, has been responsible for assessing the state-of-the-art in tracking, sensor, and intrusion technologies for application to container shipments. A set of these technologies will be demonstrated on an actual container shipment from central Europe to New England in the coming months. The Volpe Center is also analyzing the supply chain process as typified by this demonstration.

This issue of *Highlights* features a project related to port protection that the Center is performing for the CTTSO/TSWG. A Volpe team is designing and constructing the prototype Vessel Identification and Position System, which will enhance real-time, situation awareness capabilities in ports.

We are proud to support these homeland security efforts and will continue to serve as needed to help safeguard critical facilities and operations.

**Volpe National Transportation
Systems Center**

55 Broadway
Cambridge, MA 02142-1093

FOR MORE INFORMATION

Call: 617.494.2224

Fax: 617.494.2370

e-mail: MurrayL@volpe.dot.gov

www.volpe.dot.gov